(e) ISSN Online: 2321-9599
(p) ISSN Print: 2348-6805

ORIGINAL ARTICLE

Comparison of 0.5% hyperbaric bupivacaine at different doses after failed spinal anesthesia in cesarean section

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ABSTRACT:
Background: There are drawbacks of spinal anesthesia such as occasional failure (2–4%) to achieve an adequate sensory block. The present study was conducted to compare 0.5% hyperbaric bupivacaine at different doses repeated intrathecally after failed spinal anesthesia in cesarean section. **Materials & Methods:** This present study was conducted on 68 females of American Society of Anesthesiologists (ASA) I-II, aged between 18 and 40 years, were posted for elective cesarean section in which first spinal anesthesia was failed. Patients were divided into 2 groups of 34 each. Group I patients received 2.4 ml, and Group II patients received 2 ml of 0.5% hyperbaric bupivacaine respectively. **Results:** The mean operation in group I was 32.4 minutes, in group II was 33.5 minutes, repeat spinal at L3- L4 interface in group I was seen in 7 and in group II was seen in 6, repeat spinal at L4- L5 interface was seen in 25 in group I and 28 in group II and high spinal anesthesia in 2 in group I and 0 in group II was seen. The difference was non- significant (P> 0.05). Atropine requirement in group I was 0.13 mg and in group II was 0.02 mg. Phenylephrine requirement was 205.4 mcg in group I and 105.7 mcg in group II. The difference was significant (P< 0.05). **Conclusion:** Authors found that spinal anesthesia can be safely repeated in the cesarean section with 2.4 ml of 0.5% hyperbaric bupivacaine provided after first spinal anesthesia.
Key words: Bupivacaine, Cesarean, Spinal anesthesia

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This article may be cited as: Aggarwal P, Aggarwal S. Comparison of 0.5% hyperbaric bupivacaine at different doses after failed spinal anesthesia in cesarean section. J Adv Med Dent Scie Res 2016;4(1):159-162.

INTRODUCTION

There are drawbacks of spinal anesthesia such as occasional failure (2–4%) to achieve an adequate sensory block. But still now failed spinal anesthesia and its further management is a poorly defined and relatively untouched topic in the texts and literature. The word failed implies that spinal anesthesia was attempted, but without resulting in a sensory block or a block that resulted is inadequate for that surgery. The onset of action differs between various local anesthetic agents.[1] Bupivacaine is one of the extensively studied and well understood of these agents. Spinal anesthesia with bupivacaine is considered to have failed if anesthesia and analgesia have not been achieved within 10 min of successful intrathecal deposition of hyperbaric bupivacaine and 25 min for isobaric bupivacaine. According to current literature, failure rate of spinal anesthesia varies from 16% to <1% but most of the studies reported failure rate between 2% and 4%.[2] Cesarean section has commonly been done under spinal anesthesia. Complete failure of spinal anesthesia usually managed by either conversion to general anesthesia or by repeating the procedure of spinal anesthesia.[3] As all pregnant patients are supposed to have a high risk of aspiration and difficulty in intubation so, conversion to general anesthesia is associated with relatively higher risk than the general population.[4] The present study was conducted to compare 0.5% hyperbaric bupivacaine at different doses repeated intrathecally after failed spinal anesthesia in cesarean section.

MATERIALS & METHODS

This present study was conducted in the department of Anaesthesia & Gynaecology. It comprised of 68 females of American Society of Anesthesiologists (ASA) I-II, aged between 18 and 40 years, were posted for elective cesarean section in which first spinal anesthesia was failed. All were informed regarding the study and written consent was obtained. Ethical clearance was taken prior to the study.

General data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 34 each. Group I patients received 2.4 ml, and Group II patients received 2 ml of 0.5% hyperbaric bupivacaine respectively. Both systolic BP (SBP) and diastolic BP (DBP) were monitored at 2 min interval for initial 20 min then at 3 min interval for rest of the operation. Other parameters such as DBP, pulse rate etc. was recorded. Results thus obtained were subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Total- 68		
Groups	**Group I (2.4 ml hyperbaric bupivacaine)**	**Group II (2ml hyperbaric bupivacaine)**
Number	34	34

Table I shows that group I patients (34) received 2.4 ml of 0.5% hyperbaric bupivacaine and Group II patients (34) received 2 ml of 0.5% hyperbaric bupivacaine respectively.

Table II Comparison of block characteristics in both groups

Parameters	Group I	Group II	P value
Operation time (mins)	32.4	33.5	0.12
Repeat spinal at L3- L4 interface	7	6	0.9
Repeat spinal at L4- L5 interface	25	28	0.5
High spinal	2	0	0.05

Table II, graph I shows that mean operation in group I was 32.4 minutes, in group II was 33.5 minutes, repeat spinal at L3- L4 interface in group I was seen in 7 and in group II was seen in 6, repeat spinal at L4- L5 interface was seen in 25 in group I and 28 in group II and high spinal anesthesia in 2 in group I and 0 in group II was seen. The difference was non- significant (P> 0.05).

Graph I Comparison of block characteristics in both groups

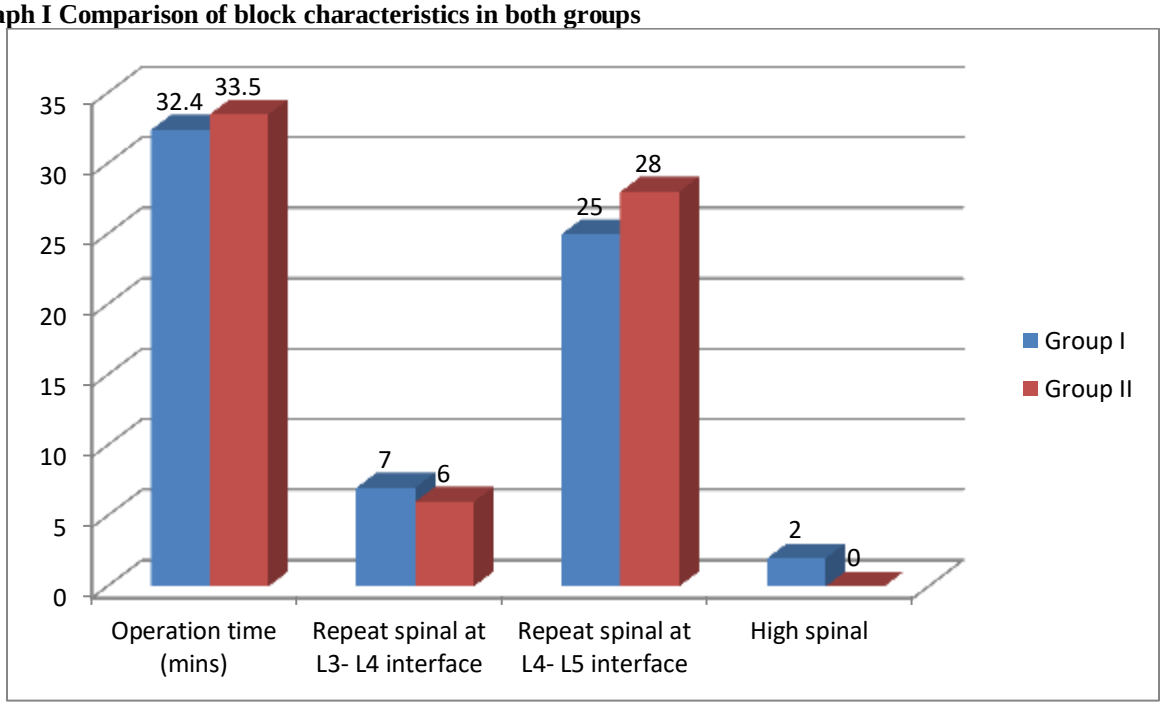
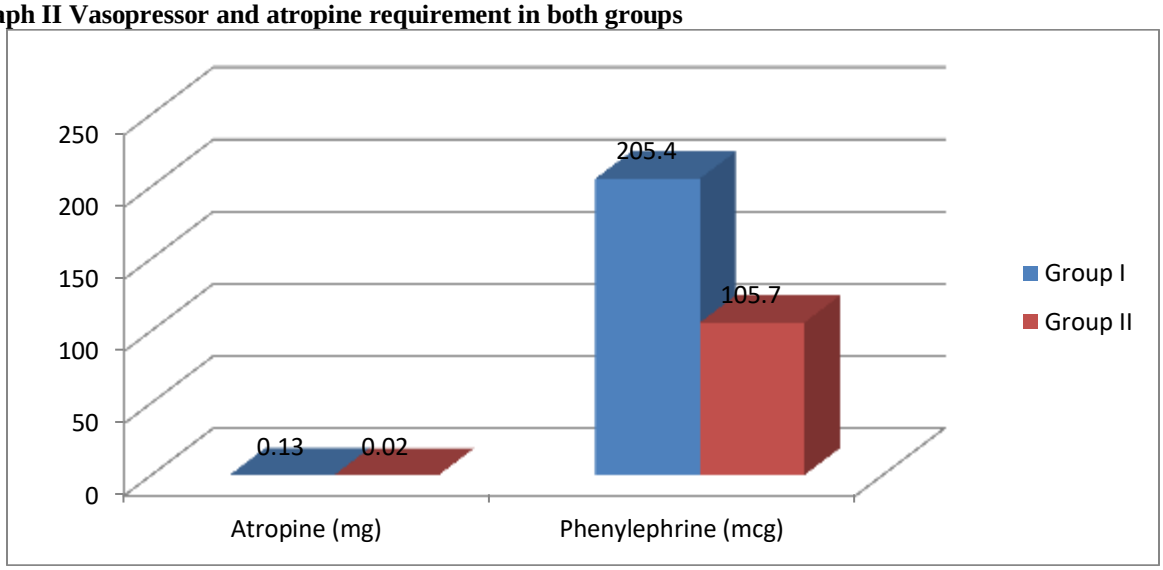


Table III Vasopressor and atropine requirement in both groups

Parameters	Group I	Group II	P value
Atropine (mg)	0.13	0.02	0.01
Phenylephrine (mcg)	205.4	105.7	0.001

Table III, graph II shows that atropine requirement in group I was 0.13 mg and in group II was 0.02 mg. Phenylephrine requirement was 205.4 mcg in group I and 105.7 mcg in group II. The difference was significant (P< 0.05).

Graph II Vasopressor and atropine requirement in both groups



DISCUSSION

General anesthesia due to its quick induction is preferred in obstetrics when urgent induction of surgery and delivery of the fetus is needed. This feature of general anesthesia is also observed in our study of elective cesarean section patients with shorter TS-H and TH-U intervals.[5] One contributing factor for these short intervals in general anesthesia is the use of muscle relaxants and volatile anesthetics that can decrease abdominal muscle tone and facilitate delivery. The other is probably due to faster surgical dissection when neonatal depressive effects of general anesthetics are considered.[6] Furthermore, when T4 sensorial level is reached in spinal anesthesia, abdominal muscle tone could still be higher than general anesthesia, as motor block routinely tested in spinal anesthesia is only for lower extremities.[7] The present study was conducted to compare 0.5% hyperbaric bupivacaine at different doses repeated intrathecally after failed spinal anesthesia in cesarean section.

In present study, group I patients (34) received 2.4 ml of 0.5% hyperbaric bupivacaine and Group II patients (34) received 2 ml of 0.5% hyperbaric bupivacaine respectively. The mean operation in group I was 32.4 minutes, in group II was 33.5 minutes, repeat spinal at L3- L4 interface in group I was seen in 7 and in group II was seen in 6, repeat spinal at L4- L5 interface was seen in 25 in group I and 28 in group II and high spinal anesthesia in 2 in group I and 0 in group II was seen.

Pokharel et al[8] conducted a study in which group A (n = 50) patients received 2.4 ml and group B (n = 50) patients received 2 ml of 0.5% hyperbaric bupivacaine respectively for administering repeat spinal anesthesia. Heart rate (HR), systolic blood pressure (SBP), diastolic blood pressure (DBP), oxygen saturation, respiratory rate and electrocardiogram were monitored both intra- and post-operatively and complications were recorded. Incidence of high spinal, bradycardia, hypotension, respiratory complications, and nausea vomiting are significantly higher in group A compared to group B ($P < 0.05$). SBP, DBP, and HR were significantly low in group A patients compared to group B in the first 10 min ($P < 0.05$).

We found that atropine requirement in group I was 0.13 mg and in group II was 0.02 mg. Phenylephrine requirement was 205.4 mcg in group I and 105.7 mcg in group II. The difference was significant ($P< 0.05$). Spinal anesthesia is the widely used anesthetic technique for cesarean section but having an occasional failure rate between 2% and 4% in current literature. Common technical errors which attribute to failed spinal anesthesia despite successful cerebrospinal fluid (CSF) tap are the improper rate of injection, entering intrathecal space at a lower spinal level than required surgical level, needlepoint partly outside of dural sac and needle in the ventral epidural region are.[9]

Inadequate dose of local anesthetic or loss of the drug from the junction of the needle and syringe may be other causes of failed block. Loss of potency of the drug due to prolonged exposure to light or high CSF alkalinity may result in failure of spinal anesthesia or in the case of ester type of local anesthetic the drug may be hydrolyzed by blood pseudo-cholinesterase when there is bloody tap.[10]

CONCLUSION

Authors found that spinal anesthesia can be safely repeated in the cesarean section with 2.4 ml of 0.5% hyperbaric bupivacaine provided after first spinal anesthesia.

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